

## CLAIMS

1. A device for transmitting data in an installation (1) for working fluids contained under ground (19), the installation comprising a cavity (13) defined in an underground formation (19) and extending from the surface of the ground (17), said cavity (13) being provided with at least one electrically conductive tubular element (21; 25), the device being of the type comprising a single-strand smooth cable (3) for supporting an action and/or measurement assembly (5), the cable having a breaking strength greater than 300 daN, being made of an electrically conductive material and being disposed in the tubular element (21; 25) between a first point at the surface of the ground (17) and a second point within the cavity (13), the device being characterized in that the surface of the cable (3) is electrically insulated, at least in part, from said tubular element (21; 25), and in that the device further comprises transmitter means (9, 11) for transmitting an electrical and/or electromagnetic signal, situated in the vicinity of one or both of the first and second points, and receiver means (9, 11) for receiving an electrical and/or electromagnetic signal situated in the vicinity of the other one or both of the first and second points; each of said transmitter means and said receiver means being electrically connected firstly to the cable (3) and secondly to the tubular element (21; 25) and/or to the formation (19); the cable (3) constituting a portion of a loop for conveying the electrical and/or electromagnetic signal between the transmitter means (9, 11) and the receiver means (9, 11).

2. A transmission device according to claim 1, characterized in that the surface of the cable (3) carries a continuous coating of insulating material and is electrically insulated from said tubular element (21; 25).

3. A transmission device according to claim 2,  
characterized in that the thickness of the continuous  
coating of insulating material is equal to half the  
difference in diameter between two standard and non-  
5 coated cables (3).

4. A transmission device according to claim 1,  
characterized in that the surface of the cable (3) is  
provided at regular intervals with centralizers (71) of  
10 insulating material for electrically insulating said  
tubular element (21; 25).

5. A transmission device according to any one of claims 1  
to 4, characterized in that the transmitter and receiver  
15 means (9, 11) in the vicinity of the first and second  
points are electrically connected to said tubular element  
(21; 25) and in that the signal transmitted by the  
transmitter means (9, 11) and received by the receiver  
means (9, 11) is an electrical signal.

20 6. A transmission device according to any one of claims 1  
to 5, characterized in that the cavity (13) is provided  
with at least a first tubular element (21) and a second  
tubular element (25) disposed inside the first element  
25 (21), and in that the cable (3) is disposed in the  
annular space between the first and second elements (21,  
25).

7. A transmission device according to any one of claims 1  
30 to 4, characterized in that the surface of the cable (3)  
has at least one electrical contact point (81) with said  
tubular element (21; 25), and in that the transmitter  
means and/or receiver means (9, 11) in the vicinity of  
the first and second points and said tubular element (21;  
35 25) are electrically connected to the formation (19).

8. A transmission device according to claim 7,  
characterized in that the electrical signal transmitted  
by the transmitter means (9) in the vicinity of the first  
point is injected to a first dipole comprising firstly an  
5 electrical contact point (84) between the cable (3) and  
the transmitter means (9) in the vicinity of the first  
point, and secondly an electrical contact point (83)  
between the formation (19) and the transmitter means (9)  
in the vicinity of the first point; the first dipole  
10 generating an electromagnetic signal that is received by  
a second dipole comprising firstly one of said electrical  
contact points (81) between the cable (3) and the tubular  
element (21; 25), and secondly an electrical contact  
point (87) between the tubular element (21; 25) and the  
15 receiver means (11) in the vicinity of the second point,  
with the electromagnetic signal received by the second  
dipole generating an electrical signal which is conveyed  
to the receiver means (11) in the vicinity of the second  
point.

20 9. A transmission device according to claim 7 or claim 8,  
characterized in that the electrical signal transmitted  
by the transmitter means (11) in the vicinity of the  
second point is injected into a second dipole comprising  
25 firstly one of said electrical contact points (81)  
between the cable and the tubular element (21; 25), and  
secondly an electrical contact point (87) between the  
tubular element (21; 25) and the transmitter means (11)  
in the vicinity of the second point, said second dipole  
30 generating an electromagnetic signal received by a first  
dipole comprising, firstly an electrical contact point  
(84) between the cable (3) and the receiver means (9) in  
the vicinity of the first point, and secondly an  
electrical contact point (83) between the formation (19)  
35 and the receiver means (9) in the vicinity of the first  
point; the electromagnetic signal received by the first  
dipole generating an electrical signal that is conveyed

to the receiver means (9) in the vicinity of the first point.

10. A transmission device according to any one of claims 5 7 to 9, characterized in that the electrical contact between the formation and the transmitter and/or receiver means in the vicinity of the first point takes place via a conductor member (83) anchored in the ground (19).

10 11. A transmission device according to any one of claims 1 to 10, characterized in that the transmitter means (9, 11) and the receiver means (9, 11) for transmitting and receiving an electrical and/or an electromagnetic signal are situated in the vicinity of respective ones of the 15 first and second points.

12. A transmission device according to any one of claims 1 to 10, characterized in that the transmitter means (9) for transmitting an electrical and/or an electromagnetic 20 signal are situated solely in the vicinity of one of the first and second points, and the receiver means (11) for receiving an electrical and/or an electromagnetic signal are situated solely in the vicinity of the other one of the first and second points.

25 13. An installation for working fluids contained underground (19), the installation comprising a cavity (13) defined in an underground formation (19) extending from the surface of the ground (17) and closed on the 30 surface by a wellhead (15), said cavity (13) being provided with at least one electrically conductive tubular element (21; 25), the installation being characterized in that it includes a transmission device according to any one of claims 1 to 12.

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14. An installation according to claim 13, characterized in that it includes an applicator device (61) for applying an insulating coating on the cable (3).

5 15. An installation according to claim 14, in which the wellhead (15) is preceded by an airlock (51) provided with a sealing device (53) for the cable (3), the installation being characterized in that the applicator  
10 device (61) for applying the insulating coating on the cable (3) is disposed inside the airlock (51) downstream from the sealing device (53).

16. An installation according to claim 14, including deployment means (7) and an alignment device (43) for  
15 putting the cable (3) into alignment in the wellhead (15), the alignment device comprising at least one pulley (49), the installation being characterized in that the applicator device (61) for applying the insulating coating on the cable (3) is disposed between the  
20 deployment means (7) and the alignment device (43), and in that the or each pulley (49) is electrically insulated from the wellhead (15) and/or the formation (19).